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Surface plasmon resonance band of ion-synthesized ag nanoparticles in high dose ag:pmma nanocomposite films

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Abstract

© 2018, Springer Science+Business Media B.V., part of Springer Nature. Characterization of nanocomposites prepared by Ag ion implantation into polymethylmethacrylate (PMMA) at different doses (2.5 × 1016, 1.0 × 1017, and 1.5 × 1017 Ag+/cm2) with a constant energy of 30Â keV and a current density of 1Â μA/cm2 in order to prepare Ag nanoparticles (NPs) was performed by UV-Vis spectroscopy. For the first time an absorption band at a wavelength of 355Â nm for the highest dose sample was observed experimentally. Changes of size and filling factor of Ag NPs in the near-surface region of ion-implanted polymers are suggested to explain this result. However, further verification is needed with more informative technique such as, for example, slow positron beam spectroscopy to probe near-surface nanometer size depth profiles.

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Keywords

Ion implantation, Metal nanoparticles, Nanocomposite films, Optical spectroscopy, Polymers, Surface plasmon resonance

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